

Name:

Solutions / Answers

Given the two functions  $f(x) = 3x - 1$  and  $g(x) = x + 2$ , Then evaluate each expression

1.  $(f+g)(x)$  or  $f(x)+g(x)$   $= 3x-1 + x+2 = 4x+1$

2.  $(f-g)(x)$  or  $f(x)-g(x)$   $= (3x-1) - (x+2)$   
 $= 3x-1-x-2$   
 $= 2x-3$

3.  $(g-f)(x)$  or  $g(x)-f(x)$   $= x+2 - (3x-1)$   
 $= x+2-3x+1$   
 $= -2x+3$

4.  $(f \cdot g)(x)$  or  $f(x) \cdot g(x)$   $= (3x-1)(x+2)$   
 $= 3x^2+5x-2$

5.  $\left(\frac{f}{g}\right)(x)$  or  $\frac{f(x)}{g(x)}$   $= \frac{3x-1}{x+2}$

$$f(x) = 3x - 1 \quad g(x) = x + 2$$

$$6. \left( \frac{g}{f} \right)(x) \text{ or } \frac{g(x)}{f(x)} = \frac{x+2}{3x-1}$$

$$7. (f \circ g)(x) \text{ or } (f(g(x))) = f(x+2) = 3(x+2) - 1 = 3x + 5$$

$$8. (g \circ f)(x) \text{ or } (g(f(x))) = g(3x-1) = 3x-1+2 = 3x+1$$

$$9. (f+g)(5) \text{ or } f(5)+g(5) = 3(5)-1 + 5+2 = 21$$

$$10. (f-g)(5) \text{ or } f(5)-g(5) = 3(5)-1 - (5+2) = 14-7 = 7$$

$$11. (g-f)(5) \text{ or } g(5)-f(5) = 5+2 - (3(5)-1) = 7-14 = -7$$

$$f(x) = 3x - 1 \quad g(x) = x + 2$$

$$12. (f \cdot g)(5) \text{ or } f(5) \cdot g(5) = (3(5) - 1)(5 + 2) = (14)(7) = 98$$

$$13. \left(\frac{f}{g}\right)(5) \text{ or } \frac{f(5)}{g(5)} = \frac{3(5) - 1}{5 + 2} = \frac{14}{7} = 2$$

$$14. \left(\frac{g}{f}\right)(5) \text{ or } \frac{g(5)}{f(5)} = \frac{5 + 2}{3(5) - 1} = \frac{7}{14} = \frac{1}{2}$$

$$15. (f \circ g)(5) \text{ or } (f(g(5))) = f(5 + 2) = f(7) = 3(7) - 1 = 20$$

$$16. (g \circ f)(5) \text{ or } (g(f(5))) = g(3(5) - 1) = g(14) = 14 + 2 = 16$$

Given the two functions  $f(x) = x^2 - 4$  and  $g(x) = x - 2$ , Then evaluate each expression

$$17. (f + g)(x) \text{ or } f(x) + g(x) = x^2 - 4 + x - 2 = x^2 + x - 6$$

$$f(x) = x^2 - 4 \quad g(x) = x - 2$$

$$18. (f-g)(x) \text{ or } f(x) - g(x) = x^2 - 4 - (x - 2) = x^2 - 4 - x + 2 = x^2 - x - 2$$

$$19. (g-f)(x) \text{ or } g(x) - f(x) = x - 2 - (x^2 - 4) = x - 2 - x^2 + 4 = -x^2 + x + 2$$

$$20. (f \cdot g)(x) \text{ or } f(x) \cdot g(x) = (x^2 - 4)(x - 2) = x^3 - 2x^2 - 4x + 8$$

$$21. \left(\frac{f}{g}\right)(x) \text{ or } \frac{f(x)}{g(x)} = \frac{x^2 - 4}{x - 2} = \frac{(x-2)(x+2)}{x-2} = x + 2$$

$$22. \left(\frac{g}{f}\right)(x) \text{ or } \frac{g(x)}{f(x)} = \frac{x - 2}{x^2 - 4} = \frac{x - 2}{(x-2)(x+2)} = \frac{1}{x+2}$$

$$23. (f \circ g)(x) \text{ or } (f(g(x))) = f(x-2) = (x-2)^2 - 4 = (x^2 - 4x + 4) - 4 = x^2 - 4x$$

$$f(x) = x^2 - 4 \quad g(x) = x - 2$$

$$24. (g \circ f)(x) \text{ or } (g(f(x))) = g(x^2 - 4) = x^2 - 4 - 2 = x^2 - 6$$

$$25. (f+g)(5) \text{ or } f(5)+g(5) = (5)^2 - 4 + 5 - 2 = 25 - 4 + 5 - 2 = 24$$

$$26. (f-g)(5) \text{ or } f(5)-g(5) = (5)^2 - 4 - (5 - 2) = 25 - 4 - 3 = 18$$

$$27. (g-f)(5) \text{ or } g(5)-f(5) = 5 - 2 - ((5)^2 - 4) = 3 - 21 = -18$$

$$28. (f \cdot g)(5) \text{ or } f(5) \cdot g(5) = ((5)^2 - 4)(5 - 2) = (21)(3) = 63$$

$$29. \left(\frac{f}{g}\right)(5) \text{ or } \frac{f(5)}{g(5)} = \frac{(5)^2 - 4}{5 - 2} = \frac{21}{3} = 7$$

$$f(x) = x^2 - 4 \quad g(x) = x - 2$$

$$30. \left(\frac{g}{f}\right)(5) \text{ or } \frac{g(5)}{f(5)} = \frac{5-2}{(5)^2-4} = \frac{3}{21} = \frac{1}{7}$$

$$31. (f \circ g)(5) \text{ or } (f(g(5))) = f(5-2) = f(3) = (3)^2 - 4 = 5$$

$$32. (g \circ f)(5) \text{ or } (g(f(5))) = g((5)^2 - 4) = g(21) = 21 - 2 = 19$$

Given the two functions  $f(x) = x^2 - 16$  and  $g(x) = \sqrt{x-1}$ , Then evaluate each expression

$$33. (f+g)(5) \text{ or } f(5)+g(5) = (5)^2 - 16 + \sqrt{5-1} = 25 - 16 + \sqrt{4} \\ = 9 + 2 \\ = 11$$

$$34. (f-g)(5) \text{ or } f(5)-g(5) = (5)^2 - 16 - (\sqrt{5-1}) = 9 - \sqrt{4} \\ = 9 - 2 \\ = 7$$

$$35. (g-f)(5) \text{ or } g(5)-f(5) = \sqrt{5-1} - ((5)^2 - 16) = \sqrt{4} - 9 \\ = 2 - 9 \\ = -7$$

$$f(x) = x^2 - 16 \quad g(x) = \sqrt{x-1}$$

$$36. (f \cdot g)(5) \text{ or } f(5) \cdot g(5) = (5^2 - 16)(\sqrt{5-1}) = (9)(\sqrt{4}) = 9 \cdot 2 = 18$$

$$37. \left(\frac{f}{g}\right)(5) \text{ or } \frac{f(5)}{g(5)} = \frac{5^2 - 16}{\sqrt{5-1}} = \frac{9}{\sqrt{4}} = \frac{9}{2}$$

$$38. \left(\frac{g}{f}\right)(5) \text{ or } \frac{g(5)}{f(5)} = \frac{\sqrt{5-1}}{5^2 - 16} = \frac{\sqrt{4}}{9} = \frac{2}{9}$$

$$39. (f \circ g)(5) \text{ or } (f(g(5))) = f(\sqrt{5-1}) = f(\sqrt{4}) = f(2) = 2^2 - 16 \\ = 4 - 16 \\ = -12$$

$$40. (g \circ f)(5) \text{ or } (g(f(5))) = g(5^2 - 16) = g(9) = \sqrt{9-1} \\ = \sqrt{8} \\ = 2\sqrt{2}$$